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JOURNAL
AND
CERTIFICATES
ON THE
Fourth Voyage
OF
Mr. BLANCHARD,

Who ascended from the
ROYAL MILITARY ACADEMY, AT CHELSEA,

The 16th of OCTOBER, 1784, at 9 Minutes past Twelve o'Clock,

AND WAS ACCCOMPANIED, AS FAR AS SUNBURY,

By JOHN SHELDON, Esq. PROFESSOR OF ANATOMY,
AND FELLOW OF THE ROYAL SOCIETY;

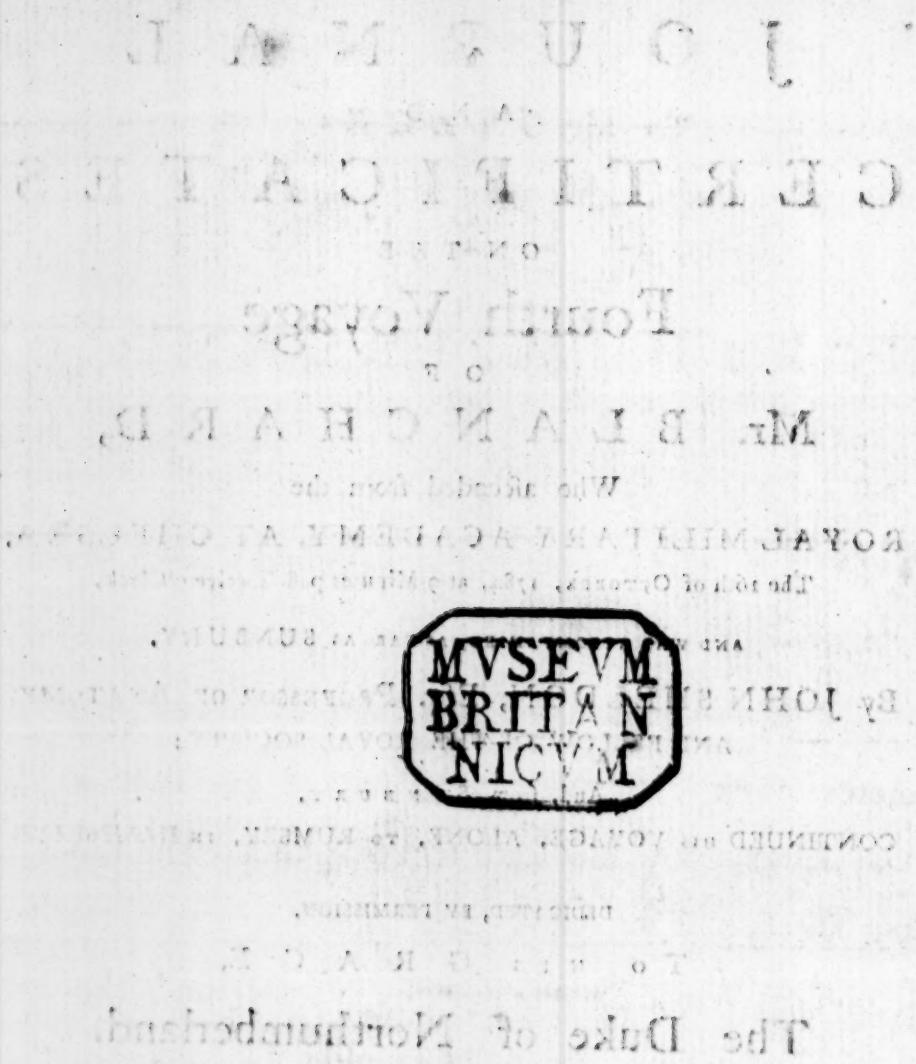
And, from SUNBURY,
CONTINUED his VOYAGE, ALONE, TO RUMSEY, IN HAMPSHIRE.

DEDICATED, BY PERMISSION,

TO HIS GRACE,

The Duke of Northumberland.

LONDON: PRINTED FOR THE AUTHOR,
By BAKER and GALABIN, INGRAM-COURT, FENCHURCH-STREET,
And may be had of
Messrs P. ELMLEY, Strand; R. BALDWIN, Paternoster-row; J. DEBRETT, Piccadilly;
R. FAULDER, New Bond-street; and W. BABBS, Oxford-street.
MDCCCLXXXIV.



and again ave **To his GRACE** gniothf off
 benionoray thermiqxH ym npon em world of holde
The D U K E of
NORTHUMBERLAND.

MY LORD DUKE,

WHILE your GRACE's well-known Taste for
 the fine Arts adds Lustre to your high Rank,
 and your liberal Patronage of them so abundantly
 promotes their Advancement, may I presume so
 far, MY LORD, as to dedicate to your GRACE the fol-
 lowing Sheets? They treat on a Subject as new to the
 philosophical World as it is curious in itself, and like-
 ly to be productive in its Consequences of important
 Discoveries; the Region, I ventured in, having been,
 till lately, but imperfectly explored by the Ingenuity
 of Man.

ACCOINT

The

The flattering Attention which YOUR GRACE was pleased to shew me, when my Experiment was honoured with your Presence at Chelsea, farther demands from me this feeble Tribute of my Respect as a Debt of Gratitude.

MY LORD DUKE

I have the Honour to be,
Your Grace's most Obedient
and very humble Servt
With the utmost Respect,

Novembre 27,
1784.

an
ACCOUNT

ACCOUNT OF, and OBSERVATIONS ON,

Mr. BLANCHARD's

FOURTH AERIAL VOYAGE.

I EMBARKED on Saturday last, the 16th inst.* and ascended from the Military Academy, at Chelsea, accompanied by Mr. Sheldon, professor of anatomy, and a fellow of the Royal Society in London. This gentleman, desirous of making various experiments, had furnished himself with a considerable number of instruments; and, although I had assured him the globe would not be able to rise with their weight, and that it would not be possible to multiply our observations in a manner answerable to his expectation and wishes, yet the vessel was charged with them by my intrepid companion, who tried to carry up as great a number of them as he could.

Our ascent, at first, was very inconsiderable; and, as I had foreseen, we were carried on but a few yards, waving over the surface of the ground. We found ourselves, therefore, not only under the necessity of diminishing

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* The sketch of this narrative was drawn up the 22d of October, and sent, in manuscript, to a friend.

our ballast, to enable us to retain our instruments; but, after having thus lightened the machine, the number and weight of the latter still obstructing our ascent, we were also compelled to throw over the more ponderous among them before we could rise, and, at length, to rid ourselves entirely of the rest, by dropping them into a neighbouring garden. Having received, in our ascent, a violent shock against a wall, situated too near the apparatus for filling the globe, the rebound gave us a direction towards the ground in the next garden, in which we descended and left our French-horns, drums, &c. which had escaped the first discharge.

Finding that we were kept down by the weight of the provisions, which yet remained in the boat, I assured Mr. Sheldon, that, if he was absolutely resolved to accompany me,* a new sacrifice must be made. With this he instantly complied, and thereby afforded me great satisfaction, as it would have been very painful to me to have lessened, in any degree, the pleasure he promised himself in accompanying me. I retained only my barometer, my compass, a telescope, a flageolet, and a single bottle of wine. Thus unincumbered, we rose nearly perpendicularly, and with surprizing velocity, saluting, with our English and French colours, the innumerable crouds of spectators who filled all the avenues contiguous to the spot whence we ascended.

We

~~Accordinging this to contribution from various sources and a general average~~

* I know, within a pound weight, the extent of the power which my globe is capable of exerting; but, as my fellow-traveller weighed 160lb. I was obliged, on that account, to carry an inconsiderable quantity of ballast. Besides, as it was Mr. Sheldon's design to ascend to a very great height, I had not filled my globe to its utmost capacity, lest it should be too dangerous in a more rarified air. Hence proceeded the uncertainty respecting its power of ascension at the moment of our departure. No AERONAUT can exactly determine how much ballast he shall be able to carry with him when he first takes off his tubes from the apparatus.

We instantly arose to an elevation which we were unable to ascertain, as the mercury in the barometer had been divided by the introduction of some globules of air, occasioned, as I apprehend, by the violence of the shock we had just before received. Arrived at this height, I was desirous to try the power of my wings, in order to regain the place of our departure; but I perceived, that the handle of the left wing was wanting. It had been thrown out of the boat among the number of things which I had been obliged to leave behind to favour our ascension. This accident deprived me of the means of hovering, at least for a few minutes, over the place whence I embarked, as I at first intended. But, at all events, it would not have been in my power to have made my course over the city of London. I was two miles distant from its nearest extremity, and about four miles from its centre; and the wind blew directly from it. Mr. Sheldon, however, turning the FLY,† which was fastened to my boat,* whilst I bore upon the helm in a contrary direction, these opposite movements, assisted by the effort I made with the wing which remained entire, occasioned a variation of some points in our course. In this mo-

+ No other word, in English, can render the French word MOULINET, which is used in the original.

* The editors of the Paris Journal, inserting a letter of mine, dated from London, the 26th of August, 1784, omitted, I know not why, what should follow that part of it wherein I spoke of Mr. Valet, and said: "I think it incumbent upon me to inform these gentlemen, that I am not the plagiarist of Mr. Valet, and that, many years ago, I used a FLY, among other expedients, in order to raise myself up by mechanical means. This I performed, in the year 1781, at Mr. Monville's, near St. Germain en Laye. The FLY was placed horizontally over my head, and, as I observed, enabled me only to leap from the ground. I do not pretend," (continued I in the same letter,) "by this assertion, to derogate from the merit of Mr. Valet; that gentleman is too much my friend to entertain such an opinion of me; but I will disarm, if possible, the malignity of criticism."

ment, we were rapidly carried to the S. W. but the effect of our efforts was such as to occasion the globe to make two revolutions on its own axis; and now, bearing, as much as we were able, against the current of air, we re-approached, in some degree, the place whence we set off; but, from its extreme velocity, we found it was impossible to resist it for any length of time.* It appeared to us as if we had in our course described a semi-circle. We now regained our route. It was twenty minutes past twelve. Mr. Sheldon, casting his eyes over the earth, observed that the objects on its surface appeared very small, and that he felt a pain in his ears. I replied, that I saw every thing, like him, in miniature, and that my ears, too, were affected with an extraordinary sensation, but that it was a very trifling one: however, that, if he wished to proceed in a less exalted region, he need only mention it, as I had now the machine perfectly under my command. "No," replied he, "I have an entire confidence in your skill; direct your course agreeably to your own inclinations." He added, with that enthusiasm with which that situation must inspire even the most insensible the first time they experience it, "I am unable to confine myself to any particular

* I had announced, in the same letter I have mentioned, written to the editors of the Journal de Paris, that, if I found a favourable current of air, I would pass over to France. I had proposed likewise to exhibit over the city of London, and shew the effect of those means I have adopted for the direction of my boat. The circumstances I have related counteracted my projects, and I have been obliged to defer that trial till the next aerial voyage, which I propose to undertake in a short time. In general, it ought to be observed, that, when the current is too brisk, or the power of ascension too considerable, my means of direction are overpowered. But, when I am suspended in an equilibrium, and the wind is not excessive, I can derive a sufficient assistance from the wings and the fly, which I have added to my boat in my fourth aerial enterprize, to make some evolutions, and shew evidently that manœuvring is not impossible.

" particular observation. All that I see delights and enchant me. In
" this moment I possess no other power but that of admiration."

The balloon, of which I had left a twelfth part void, now appeared to be fully distended, and to form a noble sphere. The silken tubes were soon filled, and the inflammable air disengaged itself abundantly through them, so that I was not obliged to have recourse to my valve. I then informed Mr. Sheldon, that we were descending. It was now thirty minutes after twelve. He asked for the bottle; and we drank to the health of the kings of England and France, the prince of Wales, and all the royal family. After this, my companion, seeing that he could not be carried farther, observed, he should descend without regret, since he had "sa-
" luted kings from the regions above." As I could not rely on my barometer, I took off one of the fleurs de lis from my flag, and, throwing it out, it appeared to ascend rapidly; this convinced me of the quick-ness of our descent, which, before I had made this experiment, was a matter of surmise only.† All the ballast, which now remained, was a marine flag and our bottle half emptied of its liquor. To throw out these was our last resource, except our clothes, which indeed, had it been necessary, we should have ridded ourselves of likewise, to diminish as much as possible the velocity of our descent, and to avoid striking against the trees or houses, over which we were perpendicularly at that time. By a timely discharge of our bottle, we checked the progres of our descent, and pro-longed

† This effect is certainly what the AERONAUTS will find the most extraordinary. However precipitate the descent of a balloon may be, it cannot be perceived but through the undulation of light bodies, which float about more heavy ones. The latter, falling with more rapidity than the former, render the descent perceptible, which otherwise would be as undiscernable as the progress of the balloon in any other direction.

longed it some hundred yards : we then proceeded in a more easy manner towards the earth, and we alighted in a meadow near the village of Sunbury, in the county of Middlesex, situated 14 miles from London. It was here I left my fellow-traveller ; it was fifty minutes past twelve when we reached the earth.

The inhabitants of Sunbury, and of several villages in its neighbourhood, ran to us in crowds upon our arrival. The remaining wing was soon broken to pieces, through the awkward eagerness of these people to make themselves useful to me ; and it was with great difficulty that I preserved my fly and helm from the violent effect of their zeal.

During this voyage, the fly, acting on the air as a screw, appeared to me as the most simple and efficacious mode which an AERONAUTE can adopt to advance in a calm. I had no other resource in this fourth enterprise ; not having, as I before remarked, the handle of one of my wings ; and the other, as I have just observed, being broken.

My hat having been thrown out, with the instruments, at Chelsea, Mr. Sheldon endeavoured to procure me another, as well as to furnish me with some provisions to enable me to prosecute my voyage. But, after having waited some time, seeing nothing arrive, I gave way to my impatience. I had caused fresh ballast to be placed in my boat, within 20 lb. of the weight of Mr. Sheldon. — Finding that the machine was prepared, I determined, for the second time, to set off without either hat or provisions.

I had remained on the ground near thirty minutes, as well for the purpose of taking in ballast as to fasten some cords which were loose ; but, eager to make as long a voyage as possible, and having no time to lose, I only requested Mr. Sheldon to give directions, that the cords, which held down the machine, should be untied ; which being done, I arose, in the

space

space of four minutes, to an elevation equal to that in which all Paris beheld me in the CHAMP DE MARS. During this ascension, I was carried by a N.E. current; and, meeting with another, I was carried E.S.E. of Sunbury. Having then lost sight of the earth, and perceiving my globe to be greatly distended, I opened my valve, and re-descended in the current N.E. It was, at this instant, twenty-six minutes past one. Four minutes afterwards, I entered into a thick fog, in which I remained about five minutes, and through which I was carried by the same current. My globe had diminished considerably during its progress through the fog.

At thirty-eight minutes past one, the heat of the sun became excessive, and my globe distended itself anew. Being desirous of discovering if, after having parted with so much inflammable air, the globe still retained a sufficient quantity to fill itself entirely, I shut the tubes, by holding them in my hands. I instantly rose to so considerable an height, that the objects, which had just before been the subject of my admiration, I now lost sight of. The earth soon presented no other form to my eye than that of an even surface: a minute afterwards it totally disappeared. I then found myself under a clear sky, observing, from a vast elevation, the clouds moving under my feet. I imagined I was, for some time, stationary: at this elevation, I occupied myself in taking notes, which have furnished me with the observations I have been relating.

At fifty minutes past one o'clock, the pieces of ribbons, which I threw out from time to time, (to supply the defect of my damaged barometer in the observation of the rising or falling direction of the globe,) appeared to ascend. I instantly threw down a part of my ballast, which I took care to crumble in pieces, that no one should receive any hurt from its fall. In a moment I was elevated above the scattered ribbons, and was carried so high, that I began to experience great difficulty in breathing.

thing. One of the bladders, which I had in the boat, filled with atmospheric air, burst, at this instant, with a dumb report ; it frightened one of the pigeons which I had taken with me to dispatch them as couriers. The bird escaped from under my seat, and at first took her station on the side of the boat, and flew away when I endeavoured to catch her. But, unaccustomed to a region so elevated, and to so rarified an air, she could not long support herself on her wings. I followed her flight with my eye ; and could perceive she laboured hard, and was unable to fly about the globe without flapping her wings with extreme precipitation ; hardly was she able to keep up to the level of my equator.* As she wheeled round the globe, she suddenly disappeared. Concluding she was gone away, I looked downwards, in order to catch a sight of her ; when, like Noah's dove, having found "no resting-place for her foot," she returned a few moments afterwards, and reposed herself on the side of my vessel. This act of fidelity was not sufficient entirely to regain my confidence. I made the bird my prisoner, and effectually secured her with a ribbon.

Elevated to such an extraordinary height, my compass underwent no apparent variation. As I now perceived nothing but the heavens, and was equally ignorant where I was, and whither I was going, I made no use of my fly, but suffered myself to be carried away, at the mercy of the winds, without making the least attempt to resist. The observations, relative to the essential immobility of the needle, and the apparent immobility of an AEROSTAT who is borne along the current of air, convinced me, that, when he

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* The circle, to which are tied the net-work and the cords which support the gallery of an AEROSTAT, is called the equator : but I have experienced its inutility, and reformed it in my fourth voyage.

has lost sight of the earth, and has no longer any visible points of comparison, the compass becomes totally useless; for the traveller may be carried, rapidly or slowly, by the wind, in all possible directions, without any variation of the needle, and without perceiving any change in his situation, since he may advance, retreat, or move obliquely, without being sensible of the tendency of the balloon during each of these motions. The compass, therefore, can be no farther useful than where we are enabled to compare the direction of the needle with terrestrial objects; and to form an idea of the way we are making by observing the earth, which then appears as retiring on one side, and gives certain data respecting the course we pursue.

At sea, the direction of the course is determined by the angle made by the needle with the keel of the ship; but, in the exalted regions of the air, there are no possible determined points, unless one be within view of the earth. The compass will always want an angle of comparison, when an AEROSTAT is above the clouds.

At fifty-eight minutes past one, the cold became so severe, that I could no longer bear it, and I found myself under the necessity of making a nearer approach to the earth. I therefore opened my valve, and I quickly descended into a region whence it became visible. From this great height, I perceived a mass of stones, without being able to distinguish any particular form; but, from its magnitude, and the compactness of its objects, I judged it to be a town.*

I continued my descent; when, approaching within seven or eight hundred feet of the ground, I heard the frequent report of guns.

Descending still lower, my ears were stricken with the tumultuous acclamations of the people beneath. I could easily distinguish the footsteps of

* Chertsey, in the county of Surrey.

horses on full gallop. Arrived just over the town, I remained nearly stationary during the space of three minutes. I saluted the inhabitants with my colours, and turned to the S.E. throwing out, at the same time, a part of my ballast, which gave a considerable elevation to my machine.

At five minutes past two, I found that I was a second time stationary. Here I was suspended in the most delightful situation imaginable, and availed myself of this calm to try some evolutions by means of my fly and helm. I was able, indeed, to turn my boat, and consequently my balloon, at will, by the contrary impulse of their pressure on the air operating in the manner I have already described. But these two powers did not produce a sufficient effect; and I had reason to regret that I was debarred the use of my wings, whose agitation, either separately or together, impelling the balloon, would have enabled me to move about at pleasure. I shall demonstrate what I here advance on my next expedition.

After this essay, I perceived a town, and opened my valve to come nearer to it. I passed over it at 15 minutes past 2 o'clock. This place appeared to me of considerable length, but not of great breadth; a high road led through it. Being a stranger to the country, I cannot, with any degree of certainty, name the places over which I have made my course: yet, by the accounts I have had since relative to the time of my having been seen, I believe this town was Woking.

I now began to suffer extreme thirst, without having any thing left to relieve it. This circumstance should serve as a lesson to future AERONAUTS, and induce them to ballast their machine with a few bottles, but however not to consider them as ballast till they are emptied.

As the wind, on our departure from Chelsea, had carried us towards Windsor, and as I then knew not the exact distance of that royal palace from the capital, I was induced to believe, that the place I now observed

was

was that town, I therefore prepared myself to descend on a convenient spot, and pay my homage to the place honoured by his majesty's residence. But, taking my telescope, and not descrying any royal habitation, I concluded I was in a mistake, and I contented myself with saluting the inhabitants of the place, who answered me with loud acclamations. I continued my route at the same elevation.

About forty-five minutes after two, I came in sight of another town.* It had the appearance of being a considerable place. The idea of Windsor being still uppermost in my mind, I now imagined, for a second time, that I was approaching it, and resolved to make my descent there, provided I was able to come over it. I was not, at that time, in a very elevated station. I could distinguish, with great ease, the eminences from the plains and vallies. I proceeded still lower, in order to arrive within hearing of two men, whom I saw on the road. I addressed them through my speaking-trumpet, crying out, "Is that Windsor?" The simple fellows, terrified at hearing a voice in the air, and especially a voice stronger than that to which they had been accustomed, after looking whence it came, no sooner perceived me, than, instead of answering me, they instantly hurried from the spot, and took each a different road, with the greatest precipitation.

During this period, I had recourse to all my manœuvres, to enable me, as nearly as possible, to steer towards the town; in turning my fly towards the place whither I was desirous to be carried, and, at the same time, bearing upon my helm in a contrary direction. This, I am convinced, is the only mode of creating a point of resistance and thereby a central force in the air.

The experiments I have made, on this head, not only give me great encouragement, but have furnished me with considerable insights, from which I flatter myself that I shall be able still farther to improve a discovery, to which, I hope, no one will dispute my claims. I repeat, that I will demonstrate what I advance on my next aerial tour, in which I hope to bring to perfection the two-fold operation of advancing and directing my course. My first experiments will be entirely calculated for those essays previous to the grand experiment of crossing the channel, which I flatter myself I shall be able to execute, and propose soon to attempt.

The fatigue, of turning my fly and bearing upon my helm, having put me out of breath, and being no longer able to oppose the violence of the current, I no longer persisted, and rested satisfied with saluting the inhabitants, who appeared in crowds in the market-place and streets of this town. I submitted myself to the guidance of the current, and I threw out a little ballast to elevate my globe. I then proceeded in a direct line towards a mansion, not far distant, of a very noble and magnificent appearance.* Various rivulets serpentine through the environs of this building; the gardens were ornamented with a sheet of water of great extent. The desire of contemplating this charming prospect induced me to lower myself. It was now nine minutes after three o'clock. I instantly descended, and found that I was nearly perpendicularly over the building, perfectly discerning every object at the elevation of three hundred feet. I perceived many people in the park, which was directly under me; and I particularly noticed some ladies, who had fastened their handkerchiefs to

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* According to all the accounts I have had, this was the Bishop of Winchester's palace, called Farnham Castle.

their canes, and waved them in the air. I saluted them with my flag; and, after throwing down a card, on which I had hastily written a few words* to thank them, I continued my route.

When I found myself at some distance from this noble seat, I threw out a great portion of my ballast. In the space of two minutes, I was surrounded by a cloud, which soon deprived me of the prospect that had just before been the subject of my admiration: I was seized with a damp cold as I was hurried through it; and another cloud, in a region superior to this, obscured the light of the sun.

Alone among these clouds, in the midst of the most profound silence, this situation, which might be thought terrible, perfectly enchanted me.— It is in a moment of extasy, like this, in which the mind becomes elevated, that man may be allowed to exult in his discoveries. I had never before been so proud of my existence, nor ever experienced moments so delicious, as when I was meditating, from this immense height, the magnificence of the spectacle, which, in so varied a shape, I had enjoyed.

Whilst my mind was thus occupied, in my progress through this awful solitude, the sun, on a sudden, appeared again in all its splendour. Although elevated above the cloud that had deprived me of its light, yet I derived no advantage from its returning rays. Its heat had no effect upon me, and the cold I felt in this lofty region became intolerable. Then, for
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* I had previously furnished myself with printed cards, importing who I was, the place whence I set off, and the height of the barometer and thermometer, (for which blanks were left;) and I occasionally threw out these cards; which I think is an expedient very proper to be observed in order to obtain information relative to the exact course of an AEROSTAT. Being deprived of the use of my instruments, I could only write what I conjectured of my situation, without being able to ascertain it.

the second time in the same voyage, I found my situation much more elevated than that to which I ascended on my first experiment at Paris.

In this temperature I continued till thirty one minutes after three o'clock, when, opening my valve, I came downwards, and found myself suspended over another mansion, which appeared to me nearly as beautiful as that which I had lately left. I saluted the inhabitants, who answered me with shouts of joy. Many of them spoke to me, and I could easily distinguish the sound of the words from their shouts; but, being a stranger to the language, I could not understand them. This mansion was contiguous to a village over which I was then passing.

Apprehensive, from the celerity of my descent, of striking against the house-tops, I instantly regained my equilibrium, and continued my progress, veering off with an extraordinary swiftness, and still driving along the same current. At that elevation, I passed in a line between two towns,* nearly at an equal distance, just before I came over the village where I saw the mansion already spoken of.

I discovered, at forty minutes past three, another town,† into which several roads led. It appeared of considerable magnitude, and its situation seemed delightful. As it lay to the eastward of my course, I despaired of the gratification of approaching it. I was carried on by a rapid current; but, exerting all my force, as far as the damaged state of my apparatus would permit, in order to alter the direction of my globe, I had the satisfaction, in less than six minutes, of making a near approach to the town. I hung.

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* These towns were probably Alton and Sherborne, their situation on the map answering the observations I have made since. — The town, near which I perceived the seat above-mentioned, must have been Alresford; and the seat was, according to the information I have obtained, Tichburn. † It was the city of Winchester.

out my flag as I passed over its turrets, and the acclamation of the inhabitants soon convinced me I was perceived. I came down low enough to distinguish the difference of dress between the men and women, who were in crouds in all the streets. They appeared to me like groupes of puppets, moving about in all directions.

I continued my route towards the S. E. but apprehending, from the progress I had already made, that I was not at any great distance from the sea, I discharged more ballast, to try if I could discover it, and I arose to a very great height. But a fog, in which I was enveloped in ascending, and whose density seemed to increase in proportion as I penetrated through it, rendered the prospect obscure on all sides. In order, therefore, to avoid straying beyond due bounds, and running the risk of being carried away to the ocean, I moved downwards through the fog, and, in the space of three minutes, I found myself in a much lower position than I had been in since my departure from Chelsea.

Determined to finish my course, I continued my way at this inconsiderable height, endeavouring to choose a proper place for my descent. The trees and houses appearing to fly away from under my feet, I glided, if I may so express myself, along the surface of the woods, being no more than 60 feet above the trees. I traversed, in this region, some branches of canals and rivers, with a swiftness which continually varied the prospects beneath, and produced an effect extremely magnificent.

Passing over a forest, I perceived a woman leading a girl in her hand. Sensible that I could not be understood by speaking to them, I was willing, at least, to afford myself some amusement and relaxation; and I began to play an air on my flageolet, which had escaped the wreck. Hearing the sound of the instrument, they at first looked round them on all sides with an anxious curiosity; but, lifting up their eyes, they no sooner beheld me, than; imitating

mitating the two peasants, of whom I had demanded if I was near Windsor, they ran away in a consternation which I in vain endeavoured to remove by speaking to them: but they were still more alarmed, and they continued their flight with great precipitation. They took shelter among the trees, where I observed them straying for some time, till I lost sight of them.

After having traversed these woods, I was carried over an extensive valley. My attention was engaged in exploring its beauties, when I perceived I had so far descended, that I was in danger of striking against the hill which lay in my route. I instantly threw out some ballast, and regained a sufficient elevation to avoid it. At this moment, my colours, which I had placed upon the side of my vessel, fell over. Vexed at this accident, I determined to recover my loss, if possible; but, keeping my valve too long open, whilst my attention was fixed on the flag, which I kept following with my eye as it fell, I suffered too great a quantity of inflammable air to escape from my globe; and I came downwards with such velocity, that one of the feet, which was fastened to my gondola, was disjointed in striking against the ground. I consoled myself, however, in this disaster, by the pleasure I received from recovering my flag, which I had seized in the air as I was coming down. The shock I received occasioned my machine to rebound several toises high: a pound or two of ballast, thrown out, impelled it upwards to the height of 200 feet; I then threw out more, and my equilibrium was restored.

Apprehending, as I have already observed, that I was very near the sea, and having even imagined I had several times caught a glimpse of it, though not sufficiently satisfied of the reality of such appearances; the fog, too, increasing, and spreading itself on all sides; I judged it prudent here to terminate my course. In proceeding farther, I should have exposed myself,

myself, without any advantage, to dangers, the more imminent in proportion their as I was more ignorant of approach, and was going on entirely at a venture.

During this latter period of my progres, I had been looking out, as I have before remarked, for a spot proper for my descent ; and I, at length, made choice of one. A single tree, in the midst of an open field, afforded me an easy landing-place. The current was now very rapid ; and, in a few minutes, might have driven me over the channel, which determined me to stop here. I laid hold of a projecting branch of the tree, as I passed near it ; but my course was so violent, that I experienced nearly the same effect which my encounter with the wall at Chelsea had occasioned. My boat lowered itself almost to the ground ; and, when I rose up again, it continued to bound up and down several times. However, the force of my globe soon brought me to a level with the top of the tree.

I had just written a letter to a friend in London, which I fastened to the ribbon that held my pigeon in captivity. The bird flew away ; and, after making some turns in the air, appeared to fly towards the capital, where indeed she arrived with my letter the same evening. A second pigeon, which I let off after I had got out of my boat, has not since made her appearance.

I had no sooner rested on this plain, which lay in the vicinity of Rumsey, a small town in Hampshire, than the inhabitants of that place, and the neighbouring villages, came about me, shouting in the most joyful manner ; and, though a stranger to their language, I could not misapprehend their feelings. These honest people laying hold of some cords, which hung from my boat, I threw out a few handfuls of ballast, and amused them with the sight of my globe rising above their heads. I felt a satisfaction equal to that which they appeared to feel themselves in towing me into their town. My progress thither, by the nearest road, being obstruct-

ed by a gateway, I was hauled in this manner, considerably round about, over the fields. Lengthening my cordage, and diminishing my ballast, I proceeded, led on by my conductors, above the trees, the walls, and the houses, in order to enter the town. I found the streets filled with spectators: the roads, likewise, were on all sides crowded; and I enjoyed, with them, the pleasure of having rendered such a multitude happy at so easy a rate.

To give my extraordinary entry all the aid of fancy, I stood erect in my car, at the elevation of the house-tops, bearing my colours in my hand, with which I saluted the innumerable throng of spectators that surrounded me. This scene, so novel to the worthy people, who gave me so cordial a welcome, lasted till the close of the day. Wearied as I was, from having passed the preceding night in preparations for my enterprize, and from the exertions during my voyage, yet I could not deprive them of the gratification they so eagerly desired; and I suffered myself to be led by them, in this manner, several times about the town.

While I was preparing to empty my globe, a gentleman, who spoke French, accosted me, informing me he was just going to London, where he hoped to arrive early the next morning, and kindly offering to charge himself with my commands thither. This offer, although I had already dispatched my two winged couriers, was very agreeable to me. A pen and ink being brought, I wrote the following note to my friend, Mr. Hurter, an eminent enamel-painter, of Great Marlborough-street:

“ Be as easy, respecting my fate, as I myself was on parting from you. “ I made a voluntary descent, seventy-eight miles distant from London, “ at half past four. I am this moment in good health, in the town “ of Rumsay, and I shall endeavour to see you early to-morrow.”

Scarcely had this person left me, when Mr. Penton, a gentleman of the neighbourhood, forcing his way through the crowd, came and politely

ly offered me the accommodation of his house and garden. He laid hold of my colours ; and my conductors followed him, holding the cordage of my machine. I proceeded, keeping about the height of the walls ; and I alighted, in an easy manner, in his garden. After having drunk to the health of my host, my first care was to empty my globe, a process which took up double the time I had employed in filling it.

After this operation was over, I was conducted, by my kind host, into the saloon, where the neighbouring nobility and gentry were assembled, to whom Mr. Peaton did me the honour to introduce me. An excellent supper was served up, to which, as it will easily be imagined, I did great credit, as it was my first repast that day. Indeed, I had pretty severely punished myself (as the news-papers well observed) for having so unmercifully cut off my companion's provisions.

Mr. Sheldon, from the instant I had left him, had followed me on horseback ; and, having informed himself, from place to place, of the direction of my course, he arrived at Rumsey at three o'clock in the morning. I was greatly flattered by this mark of his attention. He had judged, within a few miles, the place where I should make my descent ; and, by gaining intelligence, as I have mentioned, as he went on, he had been informed, at Alton, about midnight, that I had landed, safe and in good health, at Rumsey.

The next morning, every one was kindly officious in assisting me to pack up my balloon, and transport my boat, in the most commodious manner. I trusted I should have reached the capital in the course of the day ; but our progress was retarded, at every post, by the crowds of curious people that flocked about us ; and we were obliged to sleep at Bagshot, a small town, situated 29 miles from the metropolis.

My arrival had been announced for Sunday ; and I hoped that, on the next day, we should have been able to have entered London in a private

manner : but I was under a mistake. I had no sooner arrived at the Military Academy, at Chelsea, than I was surrounded by a numerous retinue. My boat was taken by force from behind the coach, where I had caused it to be placed ; Mr. Sheldon and myself were likewise forced out of our carriages, and obliged to seat ourselves in the boat, and to proceed, with our flags in our hands, in the suite of this splendid cavalcade. A band of military music preceded our car, which was followed by a great number of carriages, and a prodigious concourse of people. In this manner did we make our entry into London ; the farther description of which I leave to those who assisted at the procession, not presuming to arrogate to myself the honours of this triumph. I wish only to triumph over envy and malignity ;—happy, indeed, could I be able to silence them !

The

The following Certificate was signed by several Noble-men and Gentlemen, present at the Royal Military Academy, at Chelsea, when Mr. Blanchard ascended.

ON Saturday, October the 16th, 1784, at 10 minutes past noon, the weather being fair, and the sky lightly charged with clouds; the wind N. E. and the barometer standing at 28; Mr. Blanchard, having, in our presence, filled his globe, in less than an hour and a half, by a process equally simple and ingenious, took his flight from the Royal Military Academy, at Chelsea, accompanied by Mr. Sheldon, Professor of Anatomy and Member of the Royal Society of London. These AERONAUTS had furnished themselves with instruments suitable to their enterprize; and Mr. Blanchard, who had improved his vehicle with new powers of direction, ascended in it, as well as his companion, with a composure and presence of mind truly admirable.

In attestation whereof, we have subscribed our names.

Signed,

Ralph Payne.	C. R. Freyne.	De Morande.
Le Comte Offun.	De Girschberg.	Louis Lochée.
S. Swinton.	Argand.	James Tregent..
Hon. Col. Gordon.	Count Zambecari.	
Musquiz.	Th. Sheldon.	
De Simolin.	De Bossey.	
Baron de Simolin.	Hurter.	
Le Chev. de Morgan.	F. de Can.	

On

On the Back of the above Certificate, Messrs. Penton and Seward inscribed
the following Attestation of the Time of my Descent.

MR. BLANCHARD descended, at Rumsey, Hants, at half past
four o'clock, this day, the 16th of October, 1784.

J. Penton.
Godwin Seward.
Henry Penton.

OBSERVATIONS.

OBSERVATIONS, made by Mr. CAVENDISH, respecting the Altitudes and Velocity of Mr. BLANCHARD's BALLOON, in the fourth Voyage, from Mr. Lochée's Military Academy, LITTLE CHELSEA, to SUNBURY, Middlesex.

Time.	Perpendicular altitude, computed from Greenwich.	Perpendicular altitude, computed at Mr. Willock's house, on Putney Heath	Perpendicular distance from line W. W.	Distance from W.* along line W. W.	Alteration of distance per minute, that is, velocity in feet per minute nearly.
h. m. s. 0 15 56	Feet. 672	Feet. 1220	Feet. 5734	Feet. 13982 E.	Feet.
- 21 26	3457	3423	6147	7163 E.	1240
- 24 7	3689	3688	5457	2520 E.	1729
- 26 34	3760	3973	5144	1954 W.	1824
- 28 38	4000	4093	5041	5655 W.	1800
- 30 38	4108	4427	5351	10035 W.	2180
- 32 49	4384		5606	14253 W.	2253
- 34 46	3676		4924	16840 W.	969

* W. is Mr. Willock's house, (at Putney Heath;) and W.W. is a line drawn through it, bearing W. $28^{\circ} 15'$ S. that is, nearly parallel to the path of the balloon. The balloon was first seen at o.h. 9 m. 45.

In the two last observations, the balloon was so nearly in the line joining Greenwich and Mr. Willock's house, that it was thought proper to compute the height in a different manner from the others, viz. by the altitudes only.

The greatest height of the balloon, therefore, between Chelsea and Sunbury, may be concluded to have been about 4000 Feet, and its greatest velocity about 25 miles an hour.

These computations were made by Mr. CAVENDISH, and sent to Mr. SHELDON, by Dr. BLAGDEN, Secretary to the Royal Society, Oct. 29, 1784.

DESCRIPTION

D E S C R I P T I O N

Of the APPARATUS and of the OPERATION of filling
the Globe.

PERSUADED that the progress of the arts depends on the communication and notoriety of the means employed in bringing them to perfection, I think it incumbent on me to give a circumstantial account of the process which I used, in filling my globe, on the day of my fourth aerial experiment.

I furnished myself with thirty buts of 108 gallons, or 432 quarts, each, (a quantity equal to about a muid and a half, Paris measure;) with two tubs of 5 feet diameter and 3 $\frac{1}{2}$ feet depth; and with two smaller tubs, made from a but of the same dimensions with the others, being sawed in two, to use as recipients.

Thirteen of my buts stood on each side, in two groupes, round the large tubs, placed at 25 feet distance from each other, within the line of the masts set up for the purpose of raising the globe, and in the like direction with them.

Over the large tubs were reversed the smaller, which served as recipients; each of them was supported by three legs, which held it up high enough for its aperture to lie nine inches below the upper rim of the tub in which they were turned, and consequently beneath the level of the water with which it was filled. On the upper end of each but was fixed a tin socket, 4 inches diameter and 6 in height, which communicated with the interior

interior part of the recipient by means of a tube of the same diameter as the socket, and contrived in such a manner as to make three turns somewhat like the proboscis of an elephant. The same end of each but was perforated, by another hole of two inches diameter, for the purpose of receiving the acid during the operations, which was stopped close by a bung wrapped round with tow. The recipient of each tub had a hole in its bottom, turned upwards, to which was adapted a tin socket of 9 inches diameter and 18 inches high, serving to conduct the inflammable air into the globe through silken tubes communicating with the under part of it, and fastened by their extremities to each of the above-mentioned sockets.

These apparatus, each consisting, as we have related, of a tub and recipient, and thirteen buts, ranged around with their tubes of communication, left between them an interval of 18 feet, affording a space proper for conducting the operation, and fastening the gondola to the net of my globe, under which it was placed.

MANNER OF FILLING THE GLOBE.

After several preliminary essays, as well to inform myself of the force and proportion of the acid, as of the quantity of air which could be produced from the different kinds of iron that are to be procured in London, I found, that the turnings of cannon, or of any other great masses of cast iron, were preferable to all other kinds. Formed into shavings of a sufficient thickness, and curled up together, they present more surface; and, lying hollow, admit the acid to operate upon them in all possible modes of contact, whilst their consistence prevents their too sudden solution, and, thereby, too quick an effervescence. I found, besides, that 1 pound of acid, properly concentrated and dephlogisticated, was sufficient to 5 pounds of water, in order to produce, in the manner I could wish, the so-

lution of the like weight of iron-turnings. I discovered, likewise, that an English pound weight of acid, thus dissolved, produced about 3 cubic feet of inflammable air; which corresponds with the estimate, though the result of a small experiment, of the celebrated BERGMAN, from which it appeared, that a cubic inch of iron produced a cubic foot of inflammable air, or from 1720 to 1730 times its own bulk. After obtaining these data, I put 100 pounds weight of turnings into each of my buts, and without staving them, as in my former operations; the iron was introduced through the tin socket, as well as about 50 pounds of parings of iron plates bent into different directions, which had been first thrown into the casks, and placed pretty equally over the bottom, for the better support of the turnings, to multiply their surfaces and to prevent their becoming a solid mass. Five hundred pounds weight of water was poured, into each but, upon these materials. The tin tubes were applied to the sockets, and stopped tight with clay at the junctions. Four other buts, in reserve, were charged in the like manner, to serve in case of necessity. These preparations were made on the eve of the experiment.

The following day, at 10 o'clock, the operation began, by charging one of the buts with 100 pounds of acid, which was poured in it through the smaller hole, made in the bottom, as I have already represented. I had the precaution to leave a void space around the tube of the funnel, (the diameter of which was half an inch less than the hole,) in order to give vent to the inflammable air whilst the cask was filling, as it would otherwise have occasioned the acid to spurt up in passing through the funnel. The acid, precipitating at first to the bottom of the water, operated but by degrees, and in this state of concentration came in contact with the iron plates, whose consistency was such as to suffer themselves to be dissolved but by degrees. The acid working slowly, the effervescence

effervescence was not too quick, and the inflammable air was produced, during the process, with great facility. The hole was afterwards stopped up with a bung wrapped round with tow, and forced in with a mallet to make it air-tight. Having soon discovered, from the process of the first but, that the proportion of ingredients was just, and that the operation, in gross, would succeed according to the calculation I had made from my several experiments, — I charged the buts all round with the same quantity of acid. Mr. Argand, a citizen of Geneva, who deserves and has my best acknowledgements, having undertaken to assist me in conducting the operation, was continually present on the day and eve of my aerial voyage : it is to his zeal and knowledge that I am indebted for the precision with which my experiment was made. Sensible that I could depend on him, when I found my first preparations were in train, I was then enabled to give my attention to other objects equally conducive to the success of my undertaking, and to be in readiness at the time I had announced. I am unequal to the task of doing justice to the merits of Mr. Argand, the friend and co-operator of Mr. Mongolfier, whom he accompanied and assisted in all his experiments. It is to this gentleman that Messrs. Charles and Robert are indebted for the ingenious and simple method of using casks in order to produce inflammable air in the gross. As a natural consequence of his modesty, this gentleman's name has scarcely been heard of among all the experiments to whose success he has so essentially contributed. To the ingenuity of Mr. Argand is likewise owing the invention of lamps without smoke, for which he has obtained a patent in England. This he had solicited in France, where he has powerful patrons ; but, too kind and communicative, he gave perhaps too early an occasion to inferior artists to appropriate his secret, in a surreptitious manner, to their own advantage. Yet, in spite of their machinations, they not only cannot rob him

of the merit of the invention, but of having brought it to such perfection, that, since their first appearance, he has had the honour to furnish many of the French nobility with this useful utensil. It was owing to Mr. Argand's assiduity, I thus openly declare, that I had the satisfaction of seeing my chemical operations conducted with all the attention requisite on the occasion.

I had already fixed my boat to the globe, which now began visibly to increase in magnitude, although the casks were not, as yet, all charged. At length, the second apparatus still continuing to operate, when the first had already ceased, this gave me an opportunity of keeping up the process without any loss of time, and without having recourse to the buts in reserve. This expedient Mr. Argand supplied by ordering the materials to be stirred about in the buts with a bar of iron, in order to renew the surfaces, and by pouring fresh acid into the buts which had ceased working. This he found convenient to adopt, rather than to have recourse to the four prepared casks, as above-mentioned, which would have required a greater expence both of time and labour. This method succeeded so well, that, by twelve o'clock, my globe was in the state I desired. The acid, newly introduced, operated upon the iron plates, which hitherto had remained unaffected, and generated a sufficient supply of inflammable air to complete the filling of my globe; whose capacity, besides, was in some degree diminished by the pressure of the net, from which the solid circle, which formed its equator, had been taken off. — This pressure gave the balloon an oval shape, as soon as the cords of the net were tightened and made fast to the car.

Without this manner of proceeding, the whole 30 buts, according to the foregoing calculation, would have been necessary. For the interior part of the balloon, which was 26 feet in diameter, contained - - - - - 9026 cubic feet.

1 lb.

1 lb. of iron producing 3 cubic feet, the 100 lb. in each but ought to produce (which, in fact, it did) 300 cubic feet for each 100 lb. Therefore the 30 buts would produce 30 times 300, that is, - - - - - 9000 cubic feet.

The 26 barrels, containing each 100 lb. of acid, consumed of it at first, - - - - - 2600 lb.

Afterwards was superadded about - - - - - 400

3000 lb. equivalent

in weight to the iron-turnings. But it produced a less effect than if it had been divided again, and put into 30 barrels, as we have related, in case the balloon had preserved its complete bulk. Whence we may perceive, that the operation in gross, combined and conducted with skill, and in exact proportions, although in wooden vessels, affords the same result as arises from small experiments made in a chemical laboratory. I should likewise observe, that, in my former operation, a great waste of acid was incurred, and that my buts, after the process, were all rendered unserviceable; whereas those used on the present occasion are in such good condition, that they will serve me on my next experiment; this difference I ought to attribute to the manner in which the operation had been conducted.

T H E E N D.

